SB
945
.W539
H75
1968

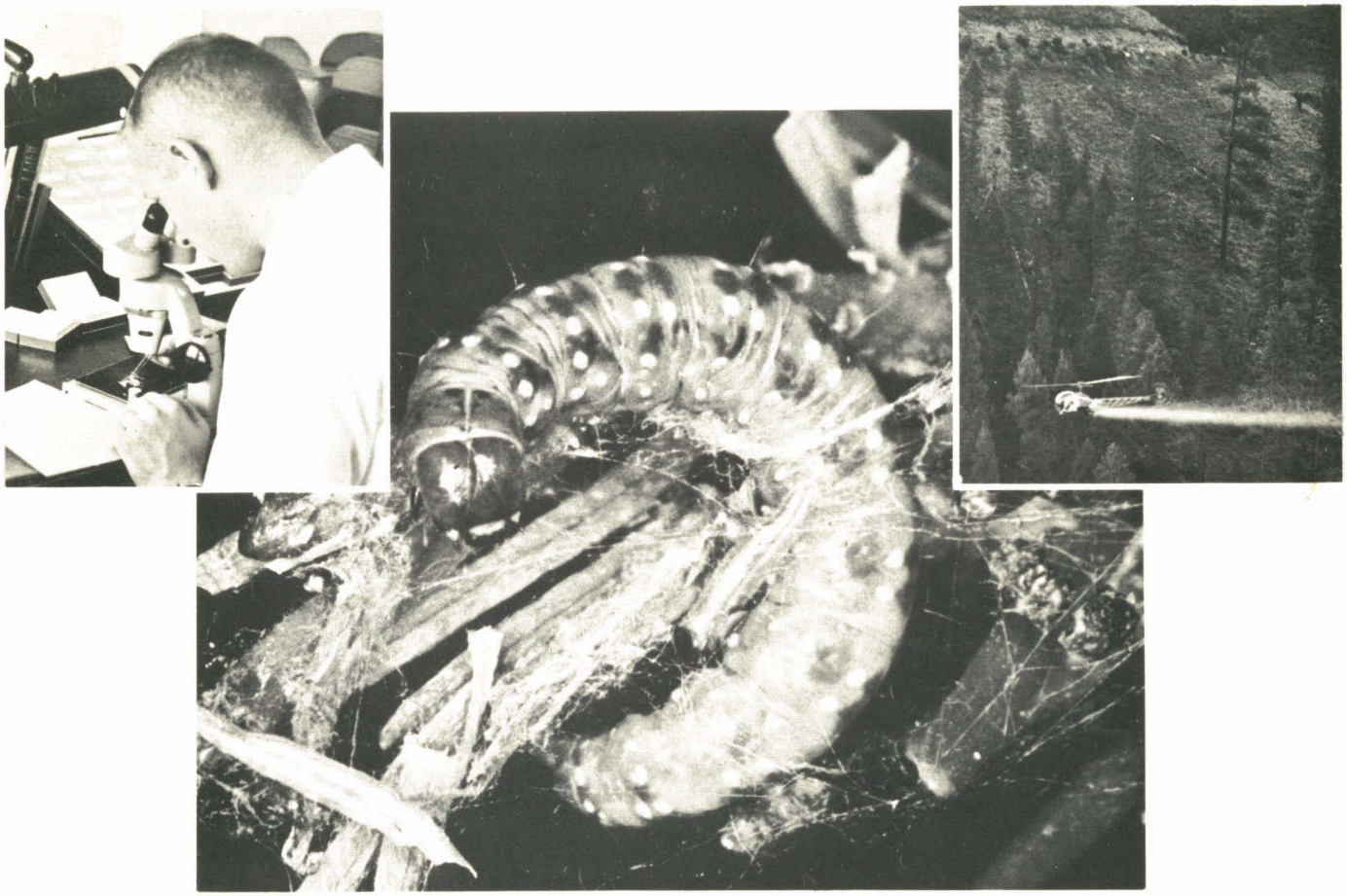
(NOT FOR PUBLICATION)

JANUARY 1968

FOREST
LAB
APR
VIC

US
FS
NR
Misc.
29

SPRUCE BUDWORM ZECTRAN PILOT CONTROL TEST



BITTERROOT NATIONAL FOREST

1966

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE—NORTHERN REGION
DIVISION OF STATE AND PRIVATE FORESTRY

MISSOULA, MONTANA

5200

TABLE OF CONTENTS

	Page
SUMMARY	1
INTRODUCTION	1
INFORMATION AND EDUCATION	2
PILOT TEST DESCRIPTION	2
OPERATIONAL PHASES	3
FORMULATION	3
AIRCRAFT	3
SPRAY OPERATIONS	4
SAFETY	5
COMMUNICATIONS	5
ENTOMOLOGICAL PHASES	5
RESULTS	8
ASSESSMENT OF SPRAY DISTRIBUTION	8
PROJECT PERSONNEL	9
APPENDIX	11

SPRUCE BUDWORM ZECTRAN PILOT CONTROL TEST
Bitterroot National Forest
1966

By

Frederick W. Honing, Entomologist
Forest Pest Control Branch

SUMMARY

During July 1966 a pilot test was conducted against spruce budworm on the Bitterroot National Forest, Montana. The carbamate insecticide Zectran (4-Dimethylamino-3, 5-xylyl methylcarbamate) was applied at the rate of 0.15 pound per acre.

Mortality to spruce budworm was 87.2 percent in Trapper Creek and 77.1 percent in Laird Creek. There were no direct effects to fish and wildlife in any of the test areas.

INTRODUCTION

The spruce budworm has defoliated Douglas-fir, true firs, and spruce for over 15 years on the Bitterroot National Forest in Montana.

Previous aerial spray programs have reduced the spruce budworm population sufficiently to increase foliation to approximately the same level as before the infestation. However, reinfestations have required some acreages to be resprayed periodically. Because of this partial success and the fact that persistent chemicals were used against the budworm, the benefits vs. hazards have been questioned.

An effort to find a new nonpersistent and selective insecticide for control of the spruce budworm and a possible substitute for DDT has been underway since 1963 by the Insecticide Evaluation Project (IEP), Pacific Southwest Forest and Range Experiment Station, U.S. Forest Service, Berkeley, California.

The carbamate insecticides generally have shown a high order of biological activity against the spruce budworm. They will also degrade rapidly within living systems. Zectran, a carbamate, is the most toxic chemical tested to date against spruce budworm. Unlike DDT, it holds its high toxicity against all instars. It is about 100 times as toxic to the sixth instar as DDT. Like DDT, it appears to exhibit its greatest biological activity on direct contact with the insect.

Limited field testing of the promising new insecticides against spruce budworm was needed. In the late summer of 1964, a study area was set aside within the West Fork of the Bitterroot River drainage. In 1965, small test areas were set up in the West Fork to conduct field studies with Zectran. Analysis of data showed that 98 percent mortality was obtained in a 335-acre area treated

with 0.12 pound of Zectran in six-tenths of a gallon per acre. On the basis of these data, research findings indicated that 95 percent reduction could be obtained with one-tenth of a pound of Zectran per acre.

In early spring of 1966 a pilot test was set up in the East and West Forks of the Bitterroot River, Bitterroot National Forest, Montana. The objectives of this test were twofold:

1. To test a promising new material (0.15 pound of Zectran per acre) against the spruce budworm, Choristoneura fumiferana (Clem.), under normal operating conditions in the field.

2. To allow research scientists to try newer methods for determining spray distribution, budworm mortality, and for measuring effects of Zectran spray application on several forms of wildlife, including small mammals, birds, grouse, fish, and fish habitat.

INFORMATION AND EDUCATION

Through public meetings, various newspaper articles, etc., the public was informed of the reasons for the test.

In early July, during the spray operation, a feature story with pictures appeared in several newspapers in the area, including the Spokesman Review, Spokane, Washington, and the Ravalli Republican, Hamilton, Montana. A similar feature story without pictures was carried in The Missoulian, Missoula, Montana.

PILOT TEST DESCRIPTION

The tests were conducted in several scattered areas. A 3,583-acre area in Trapper Creek on the West Fork of the Bitterroot River and a 1,190-acre replicate area established in Laird Creek on the East Fork Bitterroot River were the principal test locations. Two budworm mortality check areas of approximately 1,000 acres each were located in Violet Creek in the West Fork and in Andrews Creek in the East Fork. A 243-acre area in Mud Creek in the West Fork was used for grouse studies, and approximately 3 miles of Piquett Creek in the West Fork were used for fisheries studies.

The elevation of the spray areas ranged from 4,700 to 6,000 feet, with approximately 80 percent of the area ranging between 4,800 and 5,500 feet.

Except for two small acreages of private land in the main Trapper Creek spray unit, all spray areas are on Forest Service lands.

Replicate Budworm Mortality Spray Area

A 1,190-acre replicate for evaluation of budworm mortality was established in the Laird Creek drainage of the East Fork Bitterroot. No other studies were conducted in this area. This entire area was sprayed with a fixed-wing aircraft.

OPERATIONAL PHASES

FORMULATION

The Zectran concentrate was diluted with a butyl glycol (butyl ether of ethylene glycol = Dowanol) auxiliary solvent at the rate of 1.5 pounds of Zectran to make 1 gallon of solvent. One part of this mixture was then mixed with nine parts of deodorized kerosene (Diabase) for field application. This produced the 0.15 pound of Zectran in 1 gallon of solvent that was to be applied during the spray operation.

Fluorescent particles (solid, insoluble, zinc cadmium sulfide particles, 3.5 microns mass mean diameter, Helecon 2267, U.S. Radium Corporation) blended one-half of 1 percent by weight of a hydrophobic silica additive were used to trace spray distribution. As these solid particles do not penetrate tissues, do not fade on exposure to the elements, and do remain where the drops hit, it is possible to determine the number and size of drops that hit target or non-target insects, plants, or other elements. It had been further determined that the number of particles that are carried by a given spray drop is in proportion to the volume of the drop.

The insecticide, fluorescent particles, and kerosene were formulated and mixed in 1,000-gallon batches as follows:

1. 850 gallons of deodorized kerosene were pumped into the mixing tank and agitation begun.

2. 166.5 pounds of Bentone 34 were sifted very slowly into the mixing unit, making sure that it was added in quantities that would not clump and settle to the bottom of the tank. This critical stage requires constant, rapid agitation at all times.

3. 20 gallons of Ethanol were added to the mixture.

4. 166.5 pounds of fluorescent particles blended one-half of 1 percent by weight of a hydrophobic silica additive.

5. Finally, 100 gallons of Zectran concentrate (Zectran F., 1.5 pounds per gallon) were added.

AIRCRAFT

A Ford tri-motor and a helicopter used on the project were obtained under existing contracts with Johnson's Flying Service, Missoula. The chase plane was furnished by Hamilton Aviation, Inc., Hamilton, Montana, on contract for fire patrol. The aircraft were calibrated for spraying after they arrived on the project.

SPRAY OPERATIONS

Trapper Creek drainage was the main spruce budworm mortality evaluation area. Surveillance studies in this area included three U.S. Fish and Wildlife Service small mammal and bird study plots of 40 acres each, a grouse study plot, and fisheries study plots.

All mixing and loading operations were conducted on the Shook Mountain airstrip (private dirt strip). The airstrip was centrally located and little time was lost in flying to and from spray areas. Just prior to spraying, the areas were checked for unauthorized personnel, and all roads blocked with warning signs and barricades. Stockmen and beekeepers were notified prior to the time spraying was to begin.

U.S. Fish and Wildlife Service

The main Trapper Creek supports a sizable population of native trout and is quite heavily fished. A 1/8-mile strip on each side of Trapper Creek was sprayed with a helicopter to minimize drift into the stream and minimize damage to fish or aquatic insects.

A 3-mile stretch in Piquett Creek, which enters into the West Fork Bitterroot River, was set aside as a special fisheries study area for the U.S. Fish and Wildlife Service. All spray operations in this area were made from directly over the stream by a helicopter at an elevation of about 250 feet. The lower 1 mile was sprayed with three consecutive applications of Zectran, while the upper 1½ miles were sprayed only once. Fish and Wildlife biologists stated that there were no apparent effects to fish populations, and they observed only a slight increase in the number of drifting aquatic insects. Boulder Creek, which enters the West Fork Bitterroot upstream from Piquett Creek, was used as a check stream for fisheries studies.

Fish and wildlife study data will be reported separately.

Although Trapper Creek was not deliberately sprayed, insect drift in the stream was nearly as great as in Piquett Creek; however, there didn't appear to be any measurable effect on aquatic insects in Trapper Creek.

Montana Fish and Game Department

A 243-acre grouse study plot was set up in Mud Creek drainage of the West Fork by the Montana State Fish and Game Department. This plot was sprayed by helicopter on June 25 with five consecutive applications of Zectran formulation. One Creek and Two Creek were used as a check area for grouse studies. Preliminary results indicate no apparent direct effects to grouse during or after spraying. In general, observations show no apparent direct effects from the spray to birds and small mammals in any of the test areas. A complete report is being prepared by the Montana Fish and Game Department.

SAFETY

Due to the high, acute oral toxicity of Zectran, special precautions were taken to protect project personnel handling the insecticide from possible accident. During handling of the concentrate or diluted material, protective gloves and clothing were required. The insecticide had a very adverse effect on rubberized fabric; consequently, special chemical-resistant clothing was obtained and used. Persons working directly with the material were not allowed to eat or smoke unless they thoroughly washed hands and face with soap and water. Blood cholinesterase checks were made at the U.S. Public Health Service, Rocky Mountain Laboratory, Hamilton, Montana, as a routine safety measure on the spray pilots, mechanics, and all personnel formulating or handling the spray. Blood samples for the tests were taken before, during, and immediately after the spray project completion.

Pilots of the Ford tri-motor complained that insecticide fumes were particularly bad in aircraft during spraying. However, it was not determined if the fumes were actually from the insecticide or from the gasoline power unit used for pressure in the spray equipment inside the aircraft. Subsequently, masks with special filters were provided to be worn by all pilots at all times during spraying.

Blood tests showed that cholinesterase levels were not significantly different from normal values.

A night watchman was used to prevent unauthorized personnel from coming in contact with the insecticide.

There were no accidents or injuries during the course of the entire project.

COMMUNICATIONS

A six-unit radio net was obtained from the Division of Fire Control. Weather information was relayed at half-hour intervals beginning at 3:30 a.m. to the airbase. Montana Fish and Game Department and Pacific Southwest Forest and Range Experiment Station operated on separate wave lengths; consequently, three different radio systems were used. The administrative officer and project entomologist acted as radio operators at the base camp.

ENTOMOLOGICAL PHASES

Development Sampling

Some 8,682 spruce budworm larvae were collected during daily sampling for the purpose of determining the proper time for spraying. Sampling began on June 14, about 2 weeks after the second instar larvae were found to have broken hibernation. Sampling was continued until June 26, at which time the areas were released for spraying.

Samples were carefully collected at midcrown using pole pruners with an attached collecting bag. They were labeled and delivered to a central "counting room." Women counters carefully examined each foliage sample, dissected all unopened buds, collected all budworm larvae, and placed them in alcohol. Larvae were later put into Petri dishes and separated according to their instar classification.

Plots were released for spraying when daily collections showed approximately 90 percent in the fourth and fifth instars, with not more than 5 percent in the third and sixth instars.

Prespray Sampling

Single-tree plots selected as being representative were established throughout the test and check areas. Sample trees were plotted on maps, marked, and tagged with an identification number. There were 50 plots in each test area and 30 plots in each check area. All samples were taken at midcrown with pole pruners. Four 15-inch branch samples were taken from each plot 1 or 2 days prior to spray application. A total of 640 samples were taken. Women counters measured and recorded the foliated length and width of each sample branch and counted the number of buds and budworms (form 59-5240-3).

Postspray Sampling

Postspray sampling began 7 days after spraying. Sixteen 15-inch branch samples were taken at midcrown from each tree sampled during prespray sample collections. A total of 2,560 samples were collected. The counters measured and recorded the foliated length and width of each sample and counted the number of buds and budworms. Sampling is summarized in table 1.

Table 1.--Summary of samples taken and number of insects found

Area	Development samples			Prespray samples		Postspray samples	
	No. of samples	No. of budworms	Other insects	No. of samples	No. of larvae	No. of samples	No. of larvae
Trapper Creek	640	3,053	103	200	567	800	93.7
Laird Creek	436	2,084	106	200	996	800	141.7
Pine and Violet Creeks	328	2,042	152	120	603	480	333.2
Andrews Creek	296	1,503	50	120	540	480	191.8
TOTAL	1,700	8,682	411	640	2,706	2,560	760.4

Total samples taken = 4,900

Total larvae collected = 12,148

Total days sampling development = 10 (6 men)

Total days prespray sample = 3 (4 men)

Total days postspray sample = 4 (6 men)

Project started with development sampling on June 14, 1966.

Project ended with postspray sampling on July 12, 1966.

RESULTS

Results of budworm mortality are shown in table 2.

Table 2.--Mortality estimates in percentages and without Abbott's correction

Area	Bud-based mortality estimate	S.E.[1/]	Area-based mortality estimate	S.E.
Trapper Creek	87.2	1.6	82.3	2.2
Laird Creek	77.1	3.7	84.5	3.0
Violet Creek (check area)	43.9	3.4	46.0	3.5
Andrews Creek (check area)	48.5	4.8	46.0	7.8

1/ Standard error.

These data were analyzed by Gerald S. Walton, statistician, Insecticide Evaluation Project, Pacific Southwest Forest and Range Experiment Station. From Walton's past experience (personal communication), larvae-area and larvae-bud correlations, and biological considerations, the bud-based estimate is probably the better.

The difference in mortality data between Laird Creek and Trapper Creek is not completely understood. Walton's analysis indicates that, in both spray areas, the number of buds per unit branch surface changed between the pre- and post-spray sampling periods, and that this change was not consistent. For Laird Creek, the number of buds per unit area decreased over the sampling period and for Trapper Creek, it increased. The problem probably lies in size of branch sample. However, sample collections were taken by the same individuals during the entire sampling period.

ASSESSMENT OF SPRAY DISTRIBUTION

Four red Kromekote spray cards in wire holders were placed on the uphill, downhill, and remaining two sides of each sample tree. Cards were placed in clear, open spots that were not shaded from falling spray droplets. Cards and cardholders were provided by the Insecticide Evaluation Project (PSW). Cards were recovered as soon as an area had been sprayed. New cards were put out on all spray plots at the end of each day until spraying was finished.

Due to the scattered, small rain showers in the spray areas, cards were placed just prior to spraying. This meant that the card layers had to be on the job putting out the cards at 1 a.m. Spraying generally started at about 4:30 a.m.

Counts of droplets on spray deposit cards were taken from the center square centimeter using a binocular microscope and 20x magnification. Counts averaged 50.38 ± 34.70 droplets per square centimeter and ranged between 6.0 to 133.0 droplets per square centimeter. Droplet maximum was 360 microns and mmd was 164 microns. All counts were made by PSW personnel.

A regression analysis on mortality versus spray deposit was nonsignificant. However, considerable difficulty was encountered in mixing the fluorescent particles. The particles apparently did not suspend uniformly throughout the spray mixture and settled, in spite of consistent agitation. Small clumps of particles clogged the spray nozzles during the operation and further complicated the results. These droplets easily smear on the deposit cards and counts may have been individual particles from droplets or from smears of droplets.

PROJECT PERSONNEL

Project Supervisor	John Grove	Bitterroot NF
Project Entomologist	Fred Honing	Pest Control Branch, S&PF, RO
Assistant Project Entomologist	Jerald E. Dewey	Pest Control Branch, S&PF, RO
Coordinator	Robert Hensler	Custer NF
Airbase Supervisor	Richard Venable	Bitterroot NF
Air Officer	Robert Mock	Division of Fire Control, RO
Administrative Officer	Dick Bolstad	Bitterroot NF
Formulator and Mixer Operator	William Paul	Coeur d'Alene NF
Loader	1 man	Bitterroot NF
Biological Checkers	6 men	Bitterroot NF
Women Counters	5 local women	Hamilton-Darby, Montana, area

Principal Investigators of Cooperative Agencies

U.S. Fish and Wildlife Service

Fisheries studies	Dr. Richard J. Graham William R. Gould
Wildlife studies (birds and small mammals)	Edward L. Flickinger Merle L. Richmond Richard E. Pillmore

Montana State Fish and Game Department

Grouse study	Dr. Tom Mussehl Ralph Boland

Insecticide Evaluation Project, PSW, Berkeley, California

Project leader	Dr. Arthur Moore
Entomologists	Dr. Carrol Williams Paul Buffam
Meteorologist	Gerard Demarrais
Chemist	Raymond Miscus
Forestry technicians	Hubert Meyer Christopher Duckles

Missoula Equipment Development

Entomologist	Donn Cahill
Mechanical engineer	Anthony Jasumback

APPENDIX

ZECTRAN PROJECT COSTS
F.Y. 1966-67

	604		704	
AIRCRAFT				
Helicopter	$1,341.83		0	
Ford Tri-motor	1,282.54		0	
Observation plane	578.17		0	
Total Aircraft		$3,202.54		0
INSECTICIDES & CHEMICALS				
Zectran	13,263.00		0	
Fluorescent particles & three analyses	11,990.23		0	
Kerosene & transportation	2,230.80		0	
Kerosene storage	184.62		0	
Ethyl alcohol	280.01		0	
Denatured alcohol	45.20		0	
Bentone	911.90		0	
Total Insect. & Chem.		28,905.76		0
PERSONNEL				
Salaries	7,947.79		$5,659.51	
Per diem	570.78		295.46	
Total Personnel		8,518.57		$5,954.97
MISCELLANEOUS				
Mileage (WCF)	1,213.62		640.13	
Vehicle rental	989.48		475.94	
Telephone	112.70		74.50	
Photography	705.98		28.65	
Aerial photos	108.65		0	
Miscellaneous supplies	585.49		125.95	
Total Miscellaneous		3,715.92		1,345.17
FOREST CHARGE				
909 (S.O.)		1,498.00		975.00
TOTAL COSTS		$45,840.79		$8,275.14
GRAND TOTAL			$54,115.93	

SPRAY AREA DATA FORM
(Reference FSM 5242)

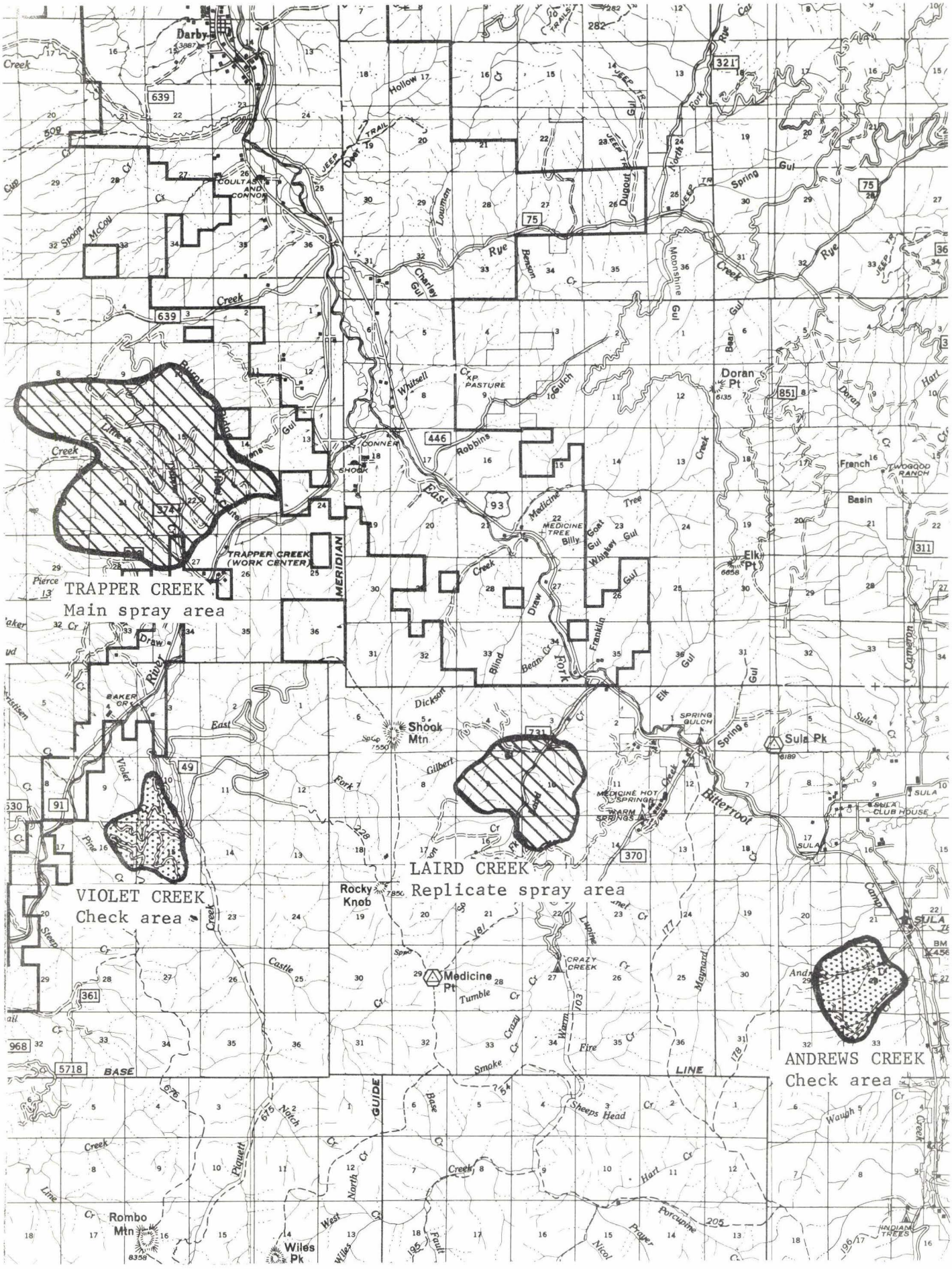
Region 1

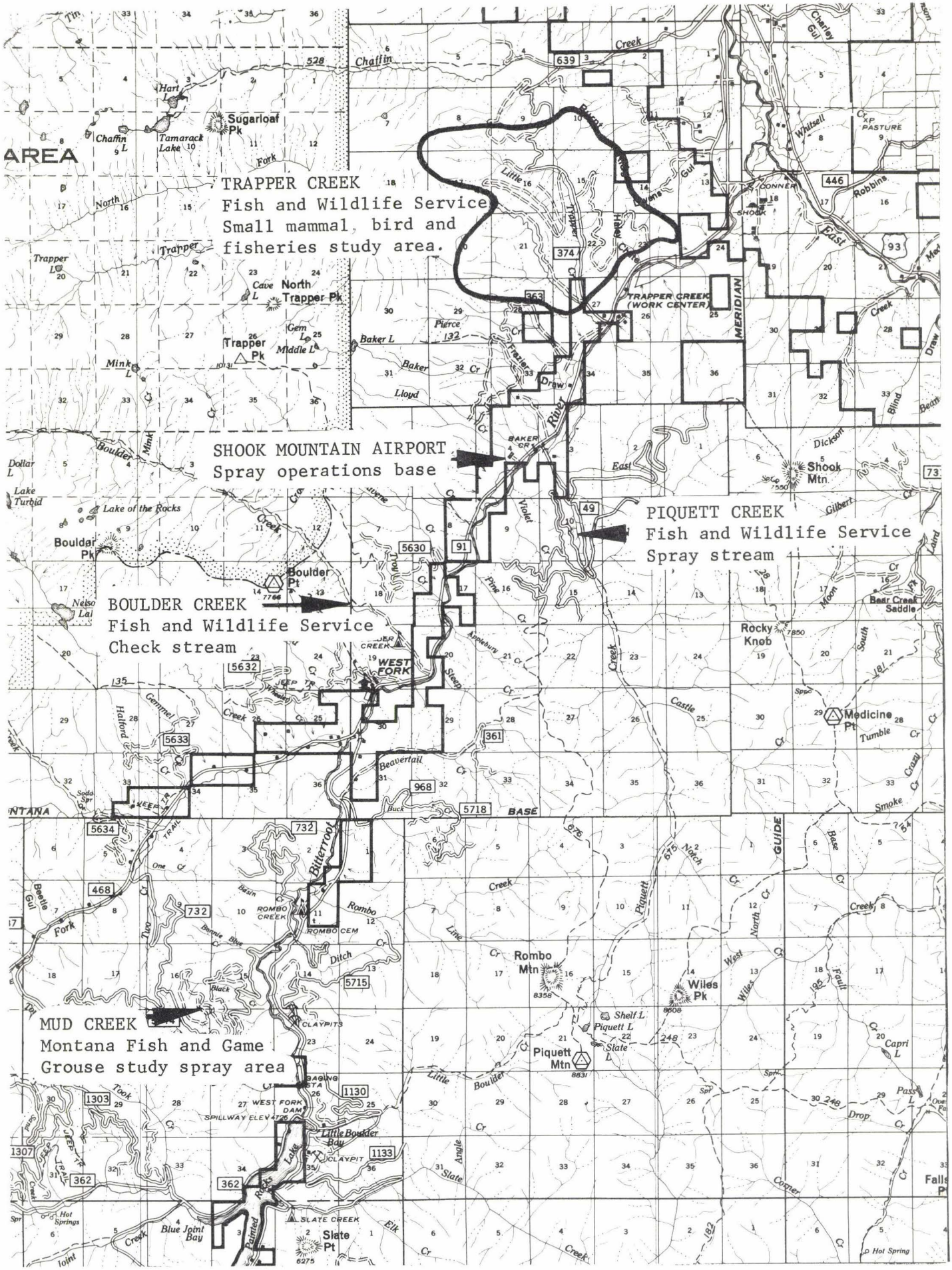
Tree No.

Checked by

Date

Branch		Length	Width	Bud count	Budworm count
Prespray	1				
	2				
	3				
	4				
Postspray	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				


TRAPPER CREEK
Main spray area
LAIRD CREEK
Replicate spray area
VIOLET CREEK
Check area
ANDREWS CREEK
Check area
TRAPPER CREEK (WORK CENTER)
MERIDIAN
BASE LINE
GUIDE
Darby
Shook Mtn
Rocky Knob
Medicine Pt
Doran Pt
Elk Pt
Sula Pk
Wiles Pk
Rombo Mtn
Sheeps Head
Bitterroot
Rye Creek
Spring Gulch
Medicine Hot Springs
Warm Springs
Crazy Creek
Sula Club House
Indian Trees
Twogood Ranch


TRAPPER CREEK
Fish and Wildlife Service
Small mammal, bird and
fisheries study area.
SHOOK MOUNTAIN AIRPORT
Spray operations base
PIQUETT CREEK
Fish and Wildlife Service
Spray stream
BOULDER CREEK
Fish and Wildlife Service
Check stream
MUD CREEK
Montana Fish and Game
Grouse study spray area
AREA
Chaffin
Hart
Sugarloaf Pk
Tamarack Lake
Trapper Pk
North Trapper Pk
Trapper Pk
Middle L
Baker L
Lloyd
Pierce
Baker
Trapper
Little
Fork
North
Creek
River
East
Dollar L
Lake Turbid
Lake of the Rocks
Boulder Pk
Boulder Pt
Nelson Lake
Shook Mtn
Bear Creek Saddle
Rocky Knob
Medicine Pt
Tumble
Castle
Gemmel
Harlow
Beaver Tail
Soda Spr
Jeep Tr
Trail
Bitterroot
Rombo
Rombo Mtn
Wiles Pk
Piquett Mtn
Shelf L
Piquett L
Slate L
Capri L
Pass L
Drop
Corner
Falls Pt
Beetle Gul
Two
One
Ditch
Black
Basin
Rombo Creek
Rombo Cem
Claypits
Claypit
Gaging Sta
West Fork Dam
Spillway Elev 4726
Little Boulder Bay
Lake
Took
Hot Springs
Blue Joint Bay
Painted Rock
Slate Creek
Slate Pt
Elk
Angle
Line
Piquett
Fault
Guide
Base
Smoke
Crazy
Tumble
Moon
South
Dickson
Gilbert
Laird
Whitsell
Charley Gul
XP Pasture
Robbins
Connem
Shook
Trapper Creek (Work Center)
Meridian
Baker Cr
Violet
Pine
Angleberry
Steep
Jeep Tr
Trail
Base
Buck
Spr
Hot Spring
528
639
374
363
132
49
91
5630
5632
5633
5634
5635
5636
5637
5638
5639
5640
5641
5642
5643
5644
5645
5646
5647
5648
5649
5650
5651
5652
5653
5654
5655
5656
5657
5658
5659
5660
5661
5662
5663
5664
5665
5666
5667
5668
5669
5670
5671
5672
5673
5674
5675
5676
5677
5678
5679
5680
5681
5682
5683
5684
5685
5686
5687
5688
5689
5690
5691
5692
5693
5694
5695
5696
5697
5698
5699
5700
5701
5702
5703
5704
5705
5706
5707
5708
5709
5710
5711
5712
5713
5714
5715
5716
5717
5718
5719
5720
5721
5722
5723
5724
5725
5726
5727
5728
5729
5730
5731
5732
5733
5734
5735
5736
5737
5738
5739
5740
5741
5742
5743
5744
5745
5746
5747
5748
5749
5750
5751
5752
5753
5754
5755
5756
5757
5758
5759
5760
5761
5762
5763
5764
5765
5766
5767
5768
5769
5770
5771
5772
5773
5774
5775
5776
5777
5778
5779
5780
5781
5782
5783
5784
5785
5786
5787
5788
5789
5790
5791
5792
5793
5794
5795
5796
5797
5798
5799
5800
5801
5802
5803
5804
5805
5806
5807
5808
5809
5810
5811
5812
5813
5814
5815
5816
5817
5818
5819
5820
5821
5822
5823
5824
5825
5826
5827
5828
5829
5830
5831
5832
5833
5834
5835
5836
5837
5838
5839
5840
5841
5842
5843
5844
5845
5846
5847
5848
5849
5850
5851
5852
5853
5854
5855
5856
5857
5858
5859
5860
5861
5862
5863
5864
5865
5866
5867
5868
5869
5870
5871
5872
5873
5874
5875
5876
5877
5878
5879
5880
5881
5882
5883
5884
5885
5886
5887
5888
5889
5890
5891
5892
5893
5894
5895
5896
5897
5898
5899
5900
5901
5902
5903
5904
5905
5906
5907
5908
5909
5910
5911
5912
5913
5914
5915
5916
5917
5918
5919
5920
5921
5922
5923
5924
5925
5926
5927
5928
5929
5930
5931
5932
5933
5934
5935
5936
5937
5938
5939
5940
5941
5942
5943
5944
5945
5946
5947
5948
5949
5950
5951
5952
5953
5954
5955
5956
5957
5958
5959
5960
5961
5962
5963
5964
5965
5966
5967
5968
5969
5970
5971
5972
5973
5974
5975
5976
5977
5978
5979
5980
5981
5982
5983
5984
5985
5986
5987
5988
5989
5990
5991
5992
5993
5994
5995
5996
5997
5998
5999
6000
6001
6002
6003
6004
6005
6006
6007
6008
6009
6010
6011
6012
6013
6014
6015
6016
6017
6018
6019
6020
6021
6022
6023
6024
6025
6026
6027
6028
6029
6030
6031
6032
6033
6034
6035
6036
6037
6038
6039
6040
6041
6042
6043
6044
6045
6046
6047
6048
6049
6050
6051
6052
6053
6054
6055
6056
6057
6058
6059
6060
6061
6062
6063
6064
6065
6066
6067
6068
6069
6070
6071
6072
6073
6074
6075
6076
6077
6078
6079
6080
6081
6082
6083
6084
6085
6086
6087
6088
6089
6090
6091
6092
6093
6094
6095
6096
6097
6098
6099
6100
6101
6102
6103
6104
6105
6106
6107
6108
6109
6110
6111
6112
6113
6114
6115
6116
6117
6118
6119
6120
6121
6122
6123
6124
6125
6126
6127
6128
6129
6130
6131
6132
6133
6134
6135
6136
6137
6138
6139
6140
6141
6142
6143
6144
6145
6146
6147
6148
6149
6150
6151
6152
6153
6154
6155
6156
6157
6158
6159
6160
6161
6162
6163
6164
6165
6166
6167
6168
6169
6170
6171
6172
6173
6174
6175
6176
6177
6178
6179
6180
6181
6182
6183
6184
6185
6186
6187
6188
6189
6190
6191
6192
6193
6194
6195
6196
6197
6198
6199
6200
6201
6202
6203
6204
6205
6206
6207
6208
6209
6210
6211
6212
6213
6214
6215
6216
6217
6218
6219
6220
6221
6222
6223
6224
6225
6226
6227
6228
6229
6230
6231
6232
6233
6234
6235
6236
6237
6238
6239
6240
6241
6242
6243
6244
6245
6246
6247
6248
6249
6250
6251
6252
6253
6254
6255
6256
6257
6258
6259
6260
6261
6262
6263
6264
6265
6266
6267
6268
6269
6270
6271
6272
6273
6274
6275
6276
6277
6278
6279
6280
6281
6282
6283
6284
6285
6286
6287
6288
6289
6290
6291
6292
6293
6294
6295
6296
6297
6298
6299
6300
6301
6302
6303
6304
6305
6306
6307
6308
6309
6310
6311
6312
6313
6314
6315
6316
6317
6318
6319
6320
6321
6322
6323
6324
6325
6326
6327
6328
6329
6330
6331
6332
6333
6334
6335
6336
6337
6338
6339
6340
6341
6342
6343
6344
6345
6346
6347
6348
6349
6350
6351
6352
6353
6354
6355
6356
6357
6358
6359
6360
6361
6362
6363
6364
6365
6366
6367
6368
6369
6370
6371
6372
6373
6374
6375
6376
6377
6378
6379
6380
6381
6382
6383
6384
6385
6386
6387
6388
6389
6390
6391
6392
6393
6394
6395
6396
6397
6398
6399
6400
6401
6402
6403
6404
6405
6406
6407
6408
6409
6410
6411
6412
6413
6414
6415
6416
6417
6418
6419
6420
6421
6422
6423
6424
6425
6426
6427
6428
6429
6430
6431
6432
6433
6434
6435
6436
6437
6438
6439
6440
6441
6442
6443
6444
6445
6446
6447
6448
6449
6450
6451
6452
6453
6454
6455
6456
6457
6458
6459
6460
6461
6462
6463
6464
6465
6466
6467
6468
6469
6470
6471
6472
6473
6474
6475
6476
6477
6478
6479
6480
6481
6482
6483
6484
6485
6486
6487
6488
6489
6490
6491
6492
6493
6494
6495
6496
6497
6498
6499
6500
6501
6502
6503
6504
6505
6506
6507
6508
6509
6510
6511
6512
6513
6514
6515
6516
6517
6518
6519
6520
6521
6522
6523
6524
6525
6526
6527
6528
6529
6530
6531
6532
6533
6534
6535
6536
6537
6538
6539
6540
6541
6542
6543
6544
6545
6546
6547
6548
6549
6550
6551
6552
6553
6554
6555
6556
6557
6558
6559
6560
6561
6562
6563
6564
6565
6566
6567
6568
6569
6570
6571
6572
6573
6574
6575
6576
6577
6578
6579
6580
6581
6582
6583
6584
6585
6586
6587
6588
6589
6590
6591
6592
6593
6594
6595
6596
6597
6598
6599
6600
6601
6602
6603
6604
6605
6606
6607
6608
6609
6610
6611
6612
6613
6614
6615
6616
6617
6618
6619
6620
6621
6622
6623
6624
6625
6626
6627
6628
6629
6630
6631
6632
6633
6634
6635
6636
6637
6638
6639
6640
6641
6642
6643
6644
6645
6646
6647
6648
6649
6650
6651
6652
6653
6654
6655
6656
6657
6658
6659
6660
6661
6662
6663
6664
6665
6666
6667
6668
6669
6670
6671
6672
6673
6674
6675
6676
6677
6678
6679
6680
6681
6682
6683
6684
6685
6686
6687
6688
6689
6690
6691
6692
6693
6694
6695
6696
6697
6698
6699
6700
6701
6702
6703
6704
6705
6706
6707
6708
6709
6710
6711
6712
6713
6714
6715
6716
6717
6718
6719
6720
6721
6722
6723
6724
6725
6726
6727
6728
6729
6730
6731
6732
6733
6734
6735
6736
6737
6738
6739
6740
6741
6742
6743
6744
6745
6746
6747
6748
6749
6750
6751
6752
6753
6754
6755
6756
6757
6758
6759
6760
6761
6762
6763
6764
6765
6766
6767
6768
6769
6770
6771
6772
6773
6774
6775
6776
6777
6778
6779
6780
6781
6782
6783
6784
6785
6786
6787
6788
6789
6790
6791
6792
6793
6794
6795
6796
6797
6798
6799
6800
6801
6802
6803
6804
6805
6806
6807
6808
6809
6810
6811
6812
6813
6814
6815
6816
6817
6818
6819
6820
6821
6822
6823
6824
6825
6826
6827
6828
6829
6830
6831
6832
6833
6834
6835
6836
6837
6838
6839
6840
6841
6842
6843
6844
6845
6846
6847
6848
6849
6850
6851
6852
6853
6854
6855
6856
6857
6858
6859
6860
6861
6862
6863
6864
6865
6866
6867
6868
6869
6870
6871
6872
6873
6874
6875
6876
6877
6878
6879
6880
6881
6882
6883
6884
6885
6886
6887
6888
6889
6890
6891
6892
6893
6894
6895
6896
6897
6898
6899
6900
6901
6902
6903
6904
6905
6906
6907
6908
6909
6910
6911
6912
6913
6914
6915
6916
6917
6918
6919
6920
6921
6922
6923
6924
6925
6926
6927
6928
6929
6930
6931
6932
6933
6934
6935
6936
6937
6938
6939
6940
6941
6942
6943
6944
6945
6946
6947
6948
6949
6950
6951
6952
6953
6954
6955
6956
6957
6958
6959
6960
6961
6962
6963
6964
6965
6966
6967
6968
6969
6970
6971
6972
6973
6974
6975
6976
6977
6978
6979
6980
6981
6982
6983
6984
6985
6986
6987
6988
6989
6990
6991
6992
6993
6994
6995
6996
6997
6998
6999
7000
7001
7002
7003
7004
7005
7006
7007
7008
7009
7010
7011
7012
7013
7014
7015
7016
7017
7018
7019
7020
7021
7022
7023
7024
7025
7026
7027
7028
7029
7030
7031
7032
7033
7034
7035
7036
7037
7038
7039
7040
7041
7042
7043
7044
7045
7046
7047
7048
7049
7050
7051
7052
7053
7054
7055
7056
7057
7058
7059
7060
7061
7062
7063
7064
7065
7066
7067
7068
7069
7070
7071
7072
7073
7074
7075
7076
7077
7078
7079
7080
7081
7082
7083
7084
7085
7086
7087
7088
7089
7090
7091
7092
7093
7094
7095
7096
7097
7098
7099
7100
7101
7102
7103
7104
7105
7106
7107
7108
7109
7110
7111
7112
7113
7114
7115
7116
7117
7118
7119
7120
7121
7122
7123
7124
7125
7126
7127
7128
7129
7130
7131
7132
7133
7134
7135
7136
7137
7138
7139
7140
7141
7142
7143
7144
7145
7146
7147
7148
7149
7150
7151
7152
7153
7154
7155
7156
7157
7158
7159
7160
7161
7162
7163
7164
7165
7166
7167
7168
7169
7170
7171
7172
7173
7174
7175
7176
7177
7178
7179
7180
7181
7182
7183
7184
7185
7186
7187
7188
7189
7190
7191
7192
7193
7194
7195
7196
7197
7198
7199
7200
7201
7202
7203
7204
7205
7206
7207
7208
7209
7210
7211
7212
7213
7214
7215
7216
7217
7218
7219
7220
7221
7222
7223
7224
7225
7226
7227
7228
7229
7230
7231
7232
7233
7234
7235
7236
7237
7238
7239
7240
7241
7242
7243
7244
7245
7246
7247
7248
7249
7250
7251
7252
7253
7254
7255
7256
7257
7258
7259
7260
7261
7262
7263
7264
7265
7266
7267
7268
7269
7270
7271
7272
7273
7274
7275
7276
7277
7278
7279
7280
7281
7282
7283
7284
7285
7286
7287
7288
7289
7290
7291
7292
7293
7294
7295
7296
7297
7298
7299
7300
7301
7302
7303
7304
7305
7306
7307
7308
7309
7310
7311
7312
7313
7314
7315
7316
7317
7318
7319
7320
7321
7322
7323
7324
7325
7326
7327
7328
7329
7330
7331
7332
7333
7334
7335
7336
7337
7338
7339
7340
7341
7342
7343
7344
7345
7346
7347
7348
7349
7350
7351
7352
7353
7354
7355
7356
7357
7358
7359
7360
7361
7362
7363
7364
7365
7366
7367
7368
7369
7370
7371
7372
7373
7374
7375
7376
7377
7378
7379
7380
7381
7382
7383
7384
7385
7386
7387
7388
7389
7390
7391
7392
7393
7394
7395
7396
7397
7398
7399
7400
7401
7402
7403
7404
7405
7406
7407
7408
7409
7410
7411
7412
7413
7414
7415
7416
7417
7418
7419
7420
7421
7422
7423
7424
7425
7426
7427
7428
7429
7430
7431
7432
7433
7434
7435
7436
7437
7438
7439
7440
7441
7442
7443
7444
7445
7446
7447
7448
7449
7450
7451
7452
7453
7454
7455
7456
7457
7458
7459
7460
7461
7462
7463
7464
7465
7466
7467
7468
7469
7470
7471
7472
7473
7474
7475
7476
7477
7478
7479
7480
7481
7482
7483
7484
7485
7486
7487
7488
7489
7490
7491
7492
7493
7494
7495
7496
7497
7498
7499
7500
7501
7502
7503
7504
7505
7506
7507
7508
7509
7510
7511
7512
7513
7514
7515
7516
7517
7518
7519
7520
7521
7522
7523
7524
7525
7526
7527
7528
7529
7530
7531
7532
7533
7534
7535
7536
7537
7538
7539
7540
7541
7542
7543
7544
7545
7546
7547
7548
7549
7550
7551
7552
7553
7554
7555
7556
7557
7558
7559
7560
7561
7562
7563
7564
7565
7566
7567
7568
7569
7570
7571
7572
7573
7574
7575
7576
7577
7578
7579
7580
7581
7582
7583
7584
7585
7586
7587
7588
7589
7590
7591
7592
7593
7594
7595
7596
7597
7598
7599
7600
7601
7602
7603
7604
7605
7606
7607
7608
7609
7610
7611
7612
7613
7614
7615
7616
7617
7618
7619
7620
7621
7622
7623
7624
7625
7626
7627
7628
7629
7630
7631
7632
7633
7634
7635
7636
7637
7638
7639
7640
7641
7642
7643
7644
7645
7646
7647
7648
7649
7650
7651
7652
7653
7654
7655
7656
7657
7658
7659
7660
7661
7662
7663
7664
7665
7666
7667
7668
7669
7670
7671
7672
7673
7674
7675
7676
7677
7678
7679
7680
7681
7682
7683
7684
7685
7686
7687
7688
7689
7690
7691
7692
7693
7694
7695
7696
7697
7698
7699
7700
7701
7702
7703
7704
7705
7706
7707
7708
7709
7710
7711
7712
7713
7714
7715
7716
7717
7718
7719
7720
7721
7722
7723
7724
7725
7726
7727
7728
7729
7730
7731
7732
7733
7734
7735
7736
7737
7738
7739
7740
7741
7742
7743
7744
7745
7746
7747
7748
7749
7750
7751
7752
7753
7754
7755
7756
7757
7758
7759
7760
7761
7762
7763
7764
7765
7766
7767
7768
7769
7770
7771
7772
7773
7774
7775
7776
7777
7778
7779
7780
7781
7782
7783
7784
7785
7786
7787
7788
7789
7790
7791
7792
7793
7794
7795
7796
7797
7798
7799
7800
7801
7802
7803
7804
7805
7806
7807
7808
7809
7810
7811
7812
7813
7814
7815
7816
7817
7818
7819
7820
7821
7822
7823
7824
7825
7826
7827
7828
7829
7830
7831
7832
7833
7834
7835
7836
7837
7838
7839
7840
7841
7842
7843
7844
7845
7846
7847
7848
7849
7850
7851
7852
7853
7854
7855
7856
7857
7858
7859
7860
7861
7862
7863
7864
7865
7866
7867
7868
7869
7870
7871
7872
7873
7874
7875
7876
7877
7878
7879
7880
7881
7882
7883
7884
7885
7886
7887
7888
7889
7890
7891
7892
7893
7894
7895
7896
7897
7898
7899
7900
7901
7902
7903
7904
7905
7906
7907
7908
7909
7910
7911
7912
7913
7914
7915
7916
7917
7918
7919
7920
7921
7922
7923
7924
7925
7926
7927
7928
7929
7930
7931
7932
7933
7934
7935
7936
7937
7938
7939
7940
7941
7942
7943
7944
7945
7946
7947
7948
7949
7950
7951
7952
7953
7954
7955
7956
7957
7958
7959
7960
7961
7962
7963
7964
7965
7966
7967
7968
7969
7970
7971
7972
7973
7974
7975
7976
7977
7978
7979
7980
7981
7982
7983
7984
7985
7986
7987
7988
7989
7990
7991
7992
7993
7994
7995
7996
7997
7998
7999
8000
8001
8002
8003
8004
8005
8006
8007
8008
8009
8010
8011
8012
8013
8014
8015
8016
8017
8018
8019
8020
8021
8022
8023
8024
8025
8026
8027
8028
8029
8030
8031
8032
8033
8034
8035
8036
8037
8038
8039
8040
8041
8042
8043
8044
8045
8046
8047
8048
8049
8050
8051
8052
8053
8054
8055
8056
8057
8058
8059
8060
8061
8062
8063
8064
8065
8066
8067
8068
8069
8070
8071
8072
8073
8074
8075
8076
8077
8078
8079
8080
8081
8082
8083
8084
8085
8086
8087
8088
8089
8090
8091
8092
8093
8094
8095
8096
8097
8098
8099
8100
8101
8102
8103
8104
8105
8106
8107
8108
8109
8110
8111
8112
8113
8114
8115
8116
8117
8118
8119
8120
8121
8122
8123
8124
8125
8126
8127
8128
8129
8130
8131
8132
8133
8134
8135
8136
8137
8138
8139
8140
8141
8142
8143
8144
8145
8146
8147
8148
8149
8150
8151
8152
8153
8154
8155
8156
8157
8158
8159
8160
8161
8162
8163
8164
8165
8166
8167
8168
8169
8170
8171
8172
8173
8174
8175
8176
8177
8178
8179
8180
8181
8182
8183
8184
8185
8186
8187
8188
8189
8190
8191
8192
8193
8194
8195
8196
8197
8198
8199
8200
8201
8202
8203
8204
8205
8206
8207
8208
8209
8210
8211
8212
8213
8214
8215
8216
8217
8218
8219
8220
8221
8222
8223
8224
8225
8226
8227
8228
8229
8230
8231
8232
8233
8234
8235
8236
8237
8238
8239
8240
8241
8242
8243
8244
8245
8246
8247
8248
8249
8250
8251
8252
8253
8254
8255
8256
8257
8258
8259
8260
8261
8262
8263
8264
8265
8266
8267
8268
8269
8270
8271
8272
8273
8274
8275
8276
8277
8278
8279
8280
8281
8282
8283
8284
8285
8286
8287
8288
8289
8290
8291
8292
8293
8294
8295
8296
8297
8298
8299
8300
8301
8302
8303
8304
8305
8306
8307
8308
8309
8310
8311
8312
8313
8314
8315
8316
8317
8318
8319
8320
8321
8322
8323
8324
8325
8326
8327
8328
8329
8330
8331
8332
8333
8334
8335
8336
8337
8338
8339
8340
8341
8342
8343
8344
8345
8346
8347
8348
8349
8350
8351
8352
8353
8354
8355
8356
8357
8358
8359
8360
8361
8362
8363
8364
8365
8366
8367
8368
8369
8370
8371
8372
8373
8374
8375
8376
8377
8378
8379
8380
8381
8382
8383
8384
8385
8386
8387
8388
8389
8390
8391
8392
8393
8394
8395
8396
8397
8398
8399
8400
8401
8402
8403
8404
8405
8406
8407
8408
8409
8410
8411
8412
8413
8414
8415
8416
8417
8418
8419
8420
8421
8422
8423
8424
8425
8426
8427
8428
8429
8430
8431
8432
8433
8434
8435
8436
8437
8438
8439
8440
8441
8442
8443
8444
8445
8446
8447
8448
8449
8450
8451
8452
8453
8454
8455
8456
8457
8458
8459
8460
8461
8462
8463
8464
8465
8466
8467
8468
8469
8470
8471
8472
8473
8474
8475
8476
8477
8478
8479
8480
8481
8482
8483
8484
8485
8486
8487
8488
8489
8490
8491
8492
8493
8494
8495
8496
8497
8498
8499
8500
8501
8502
8503
8504
8505
8506
8507
8508
8509
8510
8511
8512
8513
8514
8515
8516
8517
8518
8519
8520
8521
8522
8523
8524
8525
8526
8527
8528
8529
8530
8531
8532
8533
8534
8535
8536
8537
8538
8539
8540
8541
8542
8543
8544
8545
8546
8547
8548
8549
8550
8551
8552
8553
8554
8555
8556
8557
8558
8559
8560
8561
8562
8563
8564
8565
8566
8567
8568
8569
8570
8571
8572
8573
8574
8575
8576
8577
8578
8579
8580
8581
8582
8583
8584
8585
8586
8587
8588
8589
8590
8591
8592
8593
8594
8595
8596
8597
8598
8599
8600
8601
8602
8603
8604
8605
8606
8607
8608
8609
8610
8611
8612
8613
8614
8615
8616
8617
8618
8619
8620
8621
8622
8623
8624
8625
8626
8627
8628
8629
8630
8631
8632
8633
8634
8635
8636
8637
8638
8639
8640
8641
8642
8643
8644
8645
8646
8647
8648
8649
8650
8651
8652
8653
8654
8655
8656
8657
8658
8659
8660
8661
8662
8663
8664
8665
8666
8667
8668
8669
8670
8671
8672
8673
8674
8675
8676
8677
8678
8679
8680
8681
8682
8683
8684
8685
8686
8687
8688
8689
8690
8691
8692
8693
8694
8695
8696
8697
8698
8699
8700
8701
8702
8703
8704
8705
8706
8707
8708
8709
8710
8711
8712
8713
8714
8715
8716
8717
8718
8719
8720
8721
8722
8723
8724
8725
8726
8727
8728
8729
8730
8731
8732
8733
8734
8735
8736
8737
8738
8739
8740
8741
8742
8743
8744
8745
8746
8747
8748
8749
8750
8751
8752
8753
8754
8755
8756
8757
8758
8759
8760
8761
8762
8763
8764
8765
8766
8767
8768
8769
8770
8771
8772
8773
8774
8775
8776
8777
8778
8779
8780
8781
8782
8783
8784
8785
8786
8787
8788
8789
8790
8791
8792
8793
8794
8795
8796
8797
8798
8799
8800
8801
8802
8803
8804
8805
8806
8807
8808
8809
8810
8811
8812
8813
8814
8815
8816
8817
8818
8819
8820
8821
8822
8823
8824
8825
8826
8827
8828
8829
8830
8831
8832
8833
8834
8835
8836
8837
8838
8839
8840
8841
8842
8843
8844
8845
8846
8847
8848
8849
8850
8851
8852
8853
8854
8855
8856
8857
8858
8859
8860
8861
8862
8863
8864
8865
8866
8867
8868
8869
8870
8871
8872
8873
8874
8875
8876
8877
8878
8879
8880
8881
8882
8883
8884
8885
8886
8887
8888
8889
8890
8891
8892
8893
8894
8895
8896
8897
8898
8899
8900
8901
8902
8903
8904
8905
8906
8907
8908
8909
8910
8911
8912
8913
8914
8915
8916
8917
8918
8919
8920
8921
8922
8923
8924
8925
8926
8927
8928
8929
8930
8931
8932
8933
8934
8935
8936
8937
8938
8939
8940
8941
8942
8943
8944
8945
8946
8947
8948
8949
8950
8951
8952
8953
8954
8955
8956
8957
8958
8959
8960
8961
8962
8963
8964
8965
8966
8967
8968
8969
8970
8971
8972
8973
8974
8975
8976
8977
8978
8979
8980
8981
8982
8983
8984
8985
8986
8987
8988
8989
8990
8991
8992
8993
8994
8995
8996
8997
8998
8999
9000
9001
9002
9003
9004
9005
9006
9007
9008
9009
9010
9011
9012
9013
9014
9015
9016
9017
9018
9019
9020
9021
9022
9023
9024
9025
9026
9027
9028
9029
9030
9031
9032
9033
9034
9035
9036
9037
9038
9039
9040
9041
9042
9043
9044
9045
9046
9047
9048
9049
9050
9051
9052
9053
9054
9055
9056
9057
9058
9059
9060
9061
9062
9063
9064
9065
9066
9067
9068
9069
9070
9071
9072
9073
9074
9075
9076
9077
9078
9079
9080
9081
9082
9083
9084
9085
9086
9087
9088
9089
9090
9091
9092
9093
9094
9095
9096
9097
9098
9099
9100
9101
9102
9103
9104
9105
9106
9107
9108
9109
9110
9111
9112
9113
9114
9115
9116
9117
9118
9119
9120
9121
9122
9123
9124
9125
9126
9127
9128
9129
9130
9131
9132
9133
9134
9135
9136
9137
9138
9139
9140
9141
9142
9143
9144
9145
9146
9147
9148
9149
9150
9151
9152
9153
9154
9155
9156
9157
9158
9159
9160
9161
9162
9163
9164
9165
9166
9167
9168
9169
9170
9171
9172
9173
9174
9175
9176
9177
9178
9179
9180
9181
9182
9183
9184
9185
9186
9187
9188
9189
9190
9191
9192
9193
9194
9195
9196
9197
9198
9199
9200
9201
9202
9203
9204
9205
9206
9207
9208
9209
9210
9211
9212
9213
9214
9215
9216
9217
9218
9219
9220
9221
9222
9223
9224
9225
9226
9227
9228
9229
9230
9231
9232
9233
9234
9235
9236
9237
9238
9239
9240
9241
9242
9243
9244
9245
9246
9247
9248
9249
9250
9251
9252
9253
9254
9255
9256
9257
9258
9259
9260
9261
9262
9263
9264
9265
9266
9267
9268
9269
9270
9271
9272
9273
9274
9275
9276
9277
9278
9279
9280
9281
9282
9283
9284
9285
9286
9287
9288
9289
9290
9291
9292
9293
9294
9295
9296
9297
9298
9299
9300
9301
9302
9303
9304
9305
9306
9307
9308
9309
9310
9311
9312
9313
9314
9315
9316
9317
9318
9319
9320
9321
9322
9323
9324
9325
9326
9327
9328
9329
9330
9331
9332
9333
9334
9335
9336
9337
9338
9339
9340
9341
9342
9343
9344
9345
9346
9347
9348
9349
9350
9351
9352
9353
9354
9355
9356
9357
9358
9359
9360
9361
9362
9363
9364
9365
9366
9367
9368
9369
9370
9371
9372
9373
9374
9375
9376
9377
9378
9379
9380
9381
9382
9383
9384
9385
9386
9387
9388
9389
9390
9391
9392
9393
9394
9395
9396
9397
9398
9399
9400
9401
9402
9403
9404
9405
9406
9407
9408
9409
9410
9411
9412
9413
9414
9415
9416
9417
9418
9419
9420
9421
9422
9423
9424
9425
9426
9427
9428
9429
9430
9431
9432
9433
9434
9435
9436
9437
9438
9439
9440
9441
9442
9443
9444
9445
9446
9447
9448
9449
9450
9451
9452
9453
9454
9455
9456
9457
9458
9459
9460
9461
9462
9463
9464
9465
9466
9467
9468
9469
9470
9471
9472
9473
9474
9475
9476
9477
9478
9479
9480
9481
9482
9483
9484
9485
9486
9487
9488
9489
9490
9491
9492
9493
9494
9495
9496
9497
9498
9499
9500
9501
9502
9503
9504
9505
9506
9507
9508
9509
9510
9511
9512
9513
9514
9515
9516
9517
9518
9519
9520
9521
9522
9523
9524
9525
9526
9527
9528
9529
9530
9531
9532
9533
9534
9535
9536
9537
9538
9539
9540
9541
9542
9543
9544
9545
9546
9547
9548
9549
9550
9551
9552
9553
9554
9555
9556
9557
9558
9559
9560
9561
9562
9563
9564
9565
9566
9567
9568
9569
9570
9571
9572
9573
9574
9575
9576
9577
9578
9579
9580
9581
9582
9583
9584
9585
9586
9587
9588
9589
9590
9591
9592
9593
9594
9595
9596
9597
9598
9599
9600
9601
9602
9603
9604
9605
9606
9607
9608
9609
9610
9611
9612
9613
9614
9615
9616
9617
9618
9619
9620
9621
9622
9623
9624
9625
9626
9627
9628
9629
9630
9631
9632
9633
9634
9635
9636
9637
9638
9639
9640
9641
9642
9643
9644
9645
9646
9647
9648
9649
9650
9651
9652
9653
9654
9655
9656
9657
9658
9659
9660
9661
9662
9663
9664
9665
9666
9667
9668
9669
9670
9671
9672
9673
9674
9675
9676
9677
9678
9679
9680
9681
9682
9683
9684
9685
9686
9687
9688
9689
9690
9691
9692
9693
9694
9695
9696
9697
9698
9699
9700
9701
9702
9703
9704
9705
9706
9707
9708
9709
9710
9711
9712
9713
9714
9715
9716
9717
9718
9719
9720
9721
9722
9723
9724
9725
9726
9727
9728
9729
9730
9731
9732
9733
9734
9735
9736
9737
9738
9739
9740
9741
9742
9743
9744
9745
9746
9747
9748
9749
9750
9751
9752
9753
9754
9755
9756
9757
9758
9759
9760
9761
9762
9763
9764
9765
9766
9767
9768
9769
9770
9771
9772
9773
9774
9775
9776
9777
9778
9779
9780
9781
9782
9783
9784
9785
9786
9787
9788
9789
9790
9791
9792
9793
9794
9795
9796
9797
9798
9799
9800
9801
9802
9803
9804
9805
9806
9807
9808
9809
9810
9811
9812
9813
9814
9815
9816
9817
9818
9819
9820
9821
9822
9823
9824
9825
9826
9827
9828
9829
9830
9831
9832
9833
9834
9835
9836
9837
9838
9839
9840
9841
9842
9843
9844
9845
9846
9847
9848
9849
9850
9851
9852
9853
9854
9855
9856
9857
9858
9859
9860
9861
9862
9863
9864
9865
9866
9867
9868
9869
9870
9871
9872
9873
9874
9875
9876
9877
9878
9879
9880
9881
9882
9883
9884
9885
9886
9887
9888
9889
9890
9891
9892
9893
9894
9895
9896
9897
9898
9899
9900
9901
9902
9903
9904
9905
9906
9907
9908
9909
9910
9911
9912
9913
9914
9915
9916
9917
9918
9919
9920
9921
9922
9923
9924
9925
9926
9927
9928
9929
9930
9931
9932
9933
9934
9935
9936
9937
9938
9939
9940
9941
9942
9943
9944
9945
9946
9947
9948
9949
9950
9951
9952
9953
9954
9955
9956
9957
9958
9959
9960
9961
9962
9963
9964
9965
9966
9967
9968
9969
9970
9971
9972
9973
9974
9975
9976
9977
9978
9979
9980
9981
9982
9983
9984
9985
9986
9987
9988
9989
9990
9991
9992
9993
9994
9995
9996
9997
9998
9999
10000